

# 48 Citrus Industry

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JACKSONVILLE, FLORIDA

## Horticultural Society To Meet May 23rd and 24th in Winter Haven

The Fifty-Eighth Annual Meeting of the Florida State Horticultural Society is scheduled to meet in Winter Haven on Wednesday and Thursday, May 23rd and 24th. The War Committee on Conventions of the ODT is being asked to review their previous decision against the holding of the meeting and it is now believed that permission will be granted, and that the usual meeting will be held. This is a matter of much satisfaction to the officers who are responsible for the holding of the meeting, due to the fact that this is to be the 58th consecutive meeting of the Society since its organization in 1888. Since the early days the Society has been a factor in the education of the citrus growers of the State. Its programs are primarily educational and it is the medium through which information concerning new practices is passed on to the grower.

The meeting this year will be shortened to the extent that the usual opening program given on Tuesday evening will not be given. Instead the meeting will open on the morning of Wednesday, May 23rd, at 9:30 A. M., with brief ceremonies and will then proceed with the usual program.

Meetings will be held Wednesday morning, Wednesday afternoon, Wednesday night, Thursday morning and Thursday afternoon, adjourning after the afternoon session.

The highlights of the program for this year will be Crop Production for the war efforts, Irrigation and Water Sources, Citrus By-Products and other outlets for the citrus crop, Decline in Citrus Trees, and other problems of immediate importance to the citrus growers.

The Krome Memorial Institute will give their usual program in reference to subtropical fruits on Thursday morning, May 24th, and the Vegetable Section will give their program beginning Wednesday afternoon, May 23rd, and complete it on Thursday morning the 24th, with a combined session with the Horticultural Society on Wednesday night.

The final program will be announced through the newspapers and mailed to members about the middle of May.

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## FREE BOOKLET

Our new summer citrus  
"An Outline of Practices  
in the Grove" by B.F. Floyd



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FERTILIZERS**

**WILSON & TOOMER  
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JACKSONVILLE - FLORIDA**



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## A Study Of . . . Florida's Water Resources

Probably no subject is of greater moment to the citrus growers of Florida at this time than that of water conservation. Time was when growers had little worry over their water supply, but in recent years the lack of ample water supply at the proper time has given rise to grave concern. This condition has resulted in the formation of a "State Committee on Water Resources," and a careful survey of conditions as they actually exist.

Under the chairmanship of Frank L. Holland, this committee has prepared a bill for presentation to the legislature calling for the creation of the "Florida Department of Water Resources." In submitting this bill and a report of its findings as estimated by the survey, the committee points out that enactment of the bill is essential because:

An adequate supply of suitable water for all purposes along with control and protection against damaging kinds or amounts of water is fundamental to every person and thing in this State, and to the State itself.

Based on what we have heard and seen the Committee feels that the State must make an immediate start on a vigorous program to conserve, protect, develop, control and utilize its water resources for the public welfare.

The above statement applies to the entire State. It has more critical application to most of that part of the State lying south and east of the Suwannee River because: almost all of that large part of the State depends entirely on rainfall for all of its water, both surface and underground. In other words, for water purposes, that large part of the State may be thought of as an "island", and is not related through underground supplies or rivers with the remainder of the United States.

Such a program appears to be necessary if our State is to maintain its present population and economic development; much less increase them in some important areas.

It should also result in lands being restored to profitable use that have been abandoned due to loss of fresh water or to salt water damage.

The enactment into law of the provisions of the Bill, along with carrying out other recommendations herein, will, in our judgment, make possible a reasonable start in the right direction, the Committee so recommends.

Proper drainage, says the committee report, has played an important part in the economic development of the State. Uncontrolled and unwise drainage has played a big part in bringing about much of

the present water problem.

The report continues:

### Some Causes of Present Situation

What are the facts, as we heard them concerning causes of our present water troubles and our concern about the future? There are many, of which we will list only a few.

1. Excessive and continued drainage off or loss of surface water for various purposes and reasons.

2. The continued drainage off of much of our rain-fall, instead of trying to hold some of it in lakes, ponds, reservoirs or other suitable places for later use.

3. The careless wasting of many billions of gallons of our underground water through a large number of uncontrolled and unused flowing wells.

4. A great increase in amount of water used, from surface supplies.

5. Great increase in water used from wells.

6. The construction or digging of all kinds of ditches, canals, wells and other things with only ONE angle in mind, and failing to give thought to other angles—as to cause and result—or failure to give any consideration as to the effects of water handling plans in one district or area on adjoining areas, whether agricultural,

(Continued on page 10)

# Relationship Of Solids And Ratio To Timing Of Oil Sprays On Citrus...

W. L. THOMPSON and JOHN W. SITES<sup>1</sup>/  
Florida Citrus Experiment Station . . . To Be Presented at  
1945 Meeting of Florida State Horticultural Society  
And Included in 1945 Proceedings

Because of the high percentage of citrus fruits that are being processed at the present time and the prospects of a still larger amount to be processed in the future, in addition to the efforts made to move fruit early in the season, producers of citrus have become more and more interested in growing fruit containing a high percentage of solids. As a result of improved nutritional practices the solids in citrus have been increased but the results of some analyses made of fruit from oil timing plots indicates that indiscriminate timing of oil sprays may delay or even prevent the formation of maximum solids despite an improved nutritional program. The results presented in this paper should be treated as a preliminary report since more detailed work is needed before final conclusions can be made.

In 1929 Youthers and McBride (3) reported that on an average fruit from oil sprayed trees had lower solids than unsprayed trees but no definite statement was made concerning timing of the sprays. In California Sinclair et. al. (1) stated, "The spraying of citrus trees with light medium oils in concentrations of 0.25% to 1.75% caused a reduction in total soluble solids and in reducing and total sugars of the fruit juice." Also, "The time of the year at which the oil was applied was found to be relatively unimportant." In Florida under the present nutritional program oil sprays do not appear to have a serious effect on solids; however, during some years oil sprays applied during August, September and October have delayed the formation of maximum solids.

During the late thirties it became apparent that in order to keep scale infestations at a minimum an annual oil spray was advisable. Considerable work was done to determine the time of the

year the sprays would be most effective in controlling scale and at the same time least likely to injure the trees. Thompson (2) reported that satisfactory control of purple scale was accomplished by applying the oil spray between May 15 and August 1 with the least injury to the trees. It was also determined that where an oil spray was applied before August it did not delay the coloring of the fruit to any extent. Florida red scale was most satisfactorily controlled when the oil was applied between July 1 and August 1. At the time the general opinion was that oil sprays reduced the solids and delayed maturity to a marked extent. In 1940 some analyses were made of fruit from duplicate plots of eight trees each that had received an annual oil spray in June for a period of six years. The solids and the ratio of solids to acids were higher in those plots than plots receiving lime-sulfur 2-100 and also

higher than the solids and ratio of fruit in the unsprayed check plots. Since 1941 analyses have been made from fruit from the oil timing plots.

The analyses were made by F. F. Cowart<sup>2</sup> in 1940 and 1941, by C. R. Stearns<sup>3</sup> in 1942 and by the junior author in 1943 and 1944. The method used in making the analyses was samples of 25 oranges and 15 grapefruit of the same size were selected for each analysis. Samples were collected from the periphery of the trees at a height of from 3 to 6 feet, and insofar as possible all samples were collected from the outside of the tree. Determinations were made on the same day of collection or as shortly thereafter as possible. The juice was extracted by means of a power reamer, put through a "Waring Blender" for 20 seconds and allowed to stand for approximately 30 minutes. During this interval all the albedo fragments, ruptured juice sacs, etc., were cleared from the sample and clear aliquots of the juice were then removed for analysis. Total solids were measured with a Brix hydrometer and the reading corrected

2/ Formerly Associate Horticulturist at the Florida Citrus Experiment Station.

3/ Associate Chemist at the Florida Citrus Experiment Station.

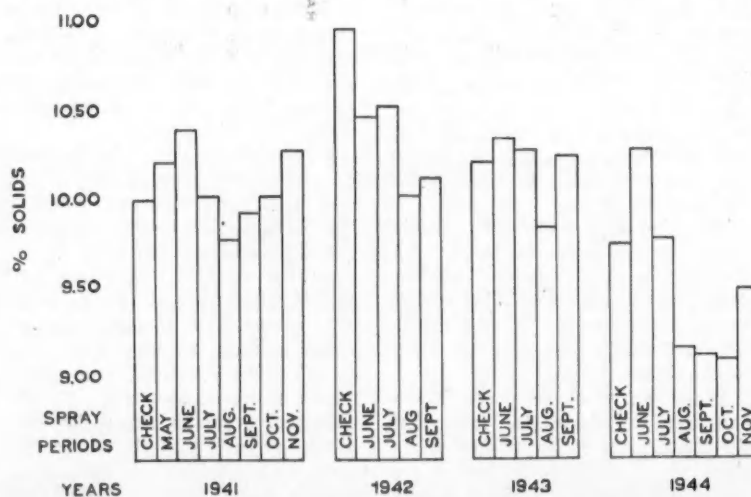


Fig. 1. — Comparison of solids in relation to timing of oil sprays on Pineapple oranges

1/ On leave of absence



to a temperature of 17.5°C. The citric acid content was determined by titration with .3125 N sodium hydroxide solution and calculated as percent anhydrous citric acid.

The trees in the experimental plots were sprayed with a commercial oil emulsion having a viscosity of approximately 72 Saybolt seconds at 100° F except in 1944 when a 100 Saybolt seconds viscosity oil was used until the months of October and November when the use of the 72 Saybolt seconds viscosity oil was continued. The sprays were applied at a concentration of 1.3% to 1.5% actual oil in various years but during any individual year the same concentration of oil was used in all plots, the only variation being the timing of the oil application, otherwise all other treatments were the same. The plots were in duplicate in all experiments.

**Solids.** The effect of oil sprays on solids in Pineapple oranges varied in different years but on an average the solids were as high in the sprayed plots as in the untreated check plots except where the sprays were applied in August or later. Figure 1 represents a general picture of the solids in fruit from trees sprayed during different months. In three out of four years the fruit from the June and July sprayed plots had solids equal to or higher than the solids in the unsprayed checks, and on an average the lowest solids were in the plots sprayed in August. In some years, particularly in 1944, the solids were also low in fruit from trees sprayed in September and October. The fruit from the November treated plots were least affected by the late season sprays which indicated that the mid-summer and early fall oil sprays prevented or at least delayed the formation of maximum solids rather than reduced them.

During the early part of the picking season it is desirable to have as high a percentage of solids as possible but it was during that period that the solids were most affected by the late seasonal sprays. In Figure 2, Figure 3 and Figure 4 are results of analyses made at various intervals during the same season. When the analyses were made in early November the solids in the late seasonal sprayed plots were decidedly lower in most of the plots than in those sprayed in June or July. Due to the possibility of low solids from late oil sprays early varieties should be sprayed

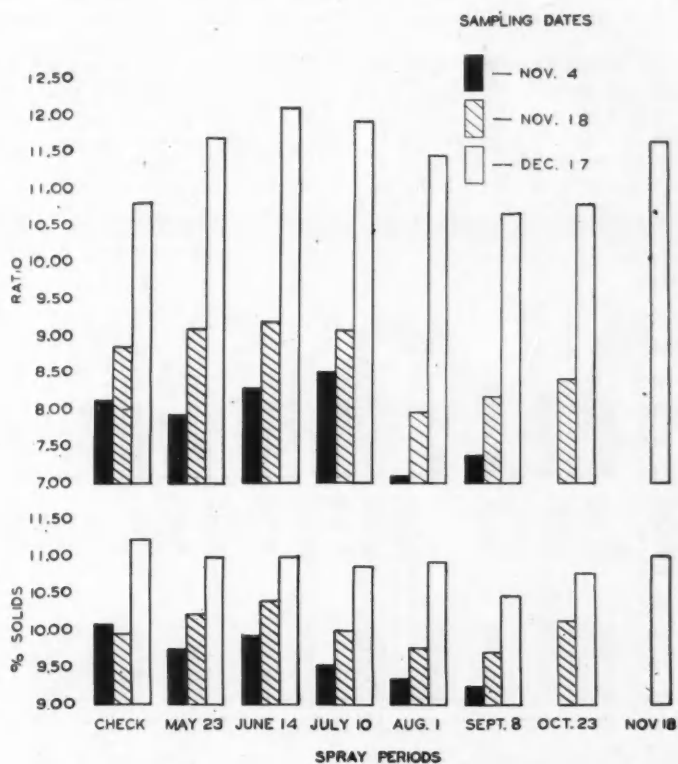


Fig. 2 — Comparison of solids and ratio from three samples in relation to timing of oil sprays on Pineapple oranges 1941

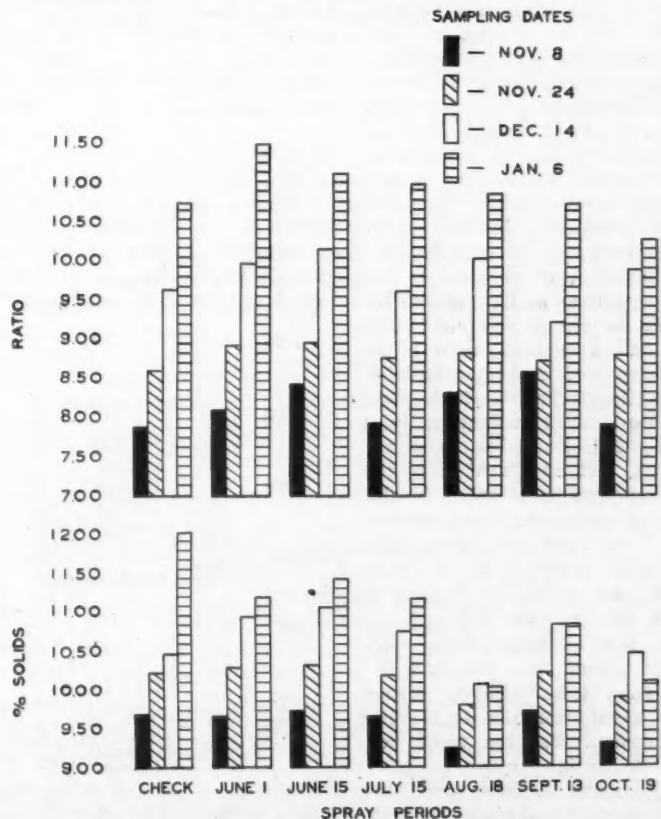


Fig. 3 — Comparison of solids and ratio from four samples in relation to timing of oil sprays on Pineapple oranges 1943

as soon in the summer as is practical.

In the above paragraph the importance of maximum solids early in the picking season is stressed but high solids are a gauge of good quality fruit regardless of the time of the season. It is particularly im-

portant to have as high a percentage of solids as possible in fruit that is to be processed, especially for concentrates. It was quite evident that where the maximum solids were prevented from forming early in the season by an application of a late summer or a fall oil spray never reached the same level as the solids in fruit from plots sprayed in June or July. The solids increased in all plots as the season progressed but regardless of when the sample was picked the solids, on an average, were lower in plots sprayed in August or later than in the unsprayed check plots and those sprayed in June or July. In the 1941 December analyses there was not so much difference in the percentage of solids in the various plots but in the December analyses of 1943 and 1944 the solids were much lower in plots sprayed after August 1 than those sprayed before that date.

Very few analyses have been made of Hamlin and Valencia oranges from trees sprayed during various months but the data available indicated that the trend of lower solids in those varieties sprayed between August and November was much the same as with Pineapples. In 1941 W. W. Lawless conducted some oil timing experi-

ments which included adjacent plots of Hamlin, Pineapple and Valencia oranges. Duplicate plots were used, the first application was made on June 25 and on the 10th and 25th of each succeeding month to November inclusive additional plots were sprayed. The spray con-

plot was in the later spray period. Comparing the average solids in the sprayed plots with the unsprayed check, 66 percent of the sprayed plots in June and July had higher solids than the check but the solids were lower than the check in all plots sprayed after August. See Figure 5.

Analyses of the Valencias were made March 24, 1942. The average percent of solids in the June and July sprayed plots was 10.20, the maximum in any one plot was 10.45 and the minimum 9.75. In the plots sprayed between August 10 and October 25 inclusive the average solids was 9.53, the maximum solids 10.40 and the minimum solids 8.90.

Analyses of the Pineapples were made November 26. The average percent of solids in the early sprayed plots was 10.52, the maximum solids in any single plot was 10.78 and the minimum 9.90. In the later sprayed plots the average solids was 10.12, the maximum in any single plot was 10.43 and the minimum 9.70. The trend of lower solids in the later sprayed plots was apparent with the three varieties which would indicate that the timing of oil sprays is important in any variety of oranges if maximum solids are desired.

When two oil sprays were applied during the same season the least effect on solids occurred where the first application was made in June and the second application in November. Where the second application was made in August or September the solids were affected to about the same degree as where a single applica-

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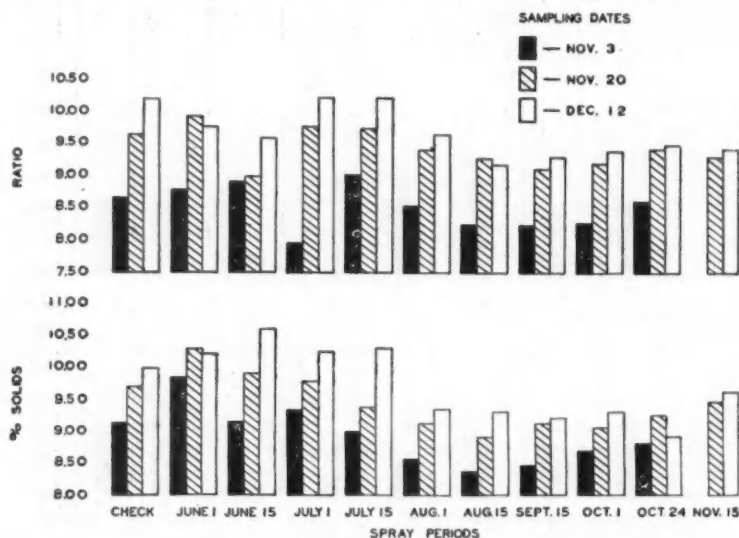


Fig. 4 — Comparison of solids and ratio from three samples in relation to timing of oil sprays on Pineapple oranges 1944

tained a concentration of 1.3% actual oil. The analyses of the Hamlins were not made until November 28 which could be considered mid-season for that variety; nevertheless the average solids were higher in the fruit from plots sprayed in June and July than those sprayed between August 10 and October 25 inclusive. Furthermore, the highest percentage of solids in any individual plot was in the early period and the lowest solids in any

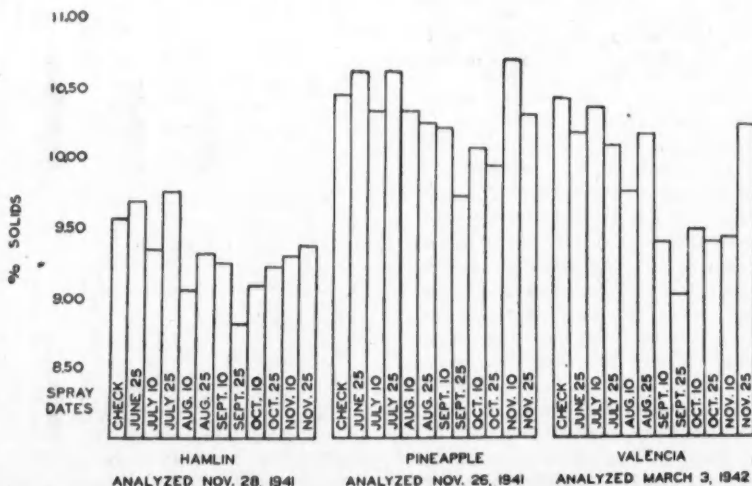


Fig. 5 — Comparison of solids in relation to timing of oil sprays on three varieties of oranges 1941

## Florida-Texas Co-Operation In Citrus Research

Texas Farming and Citriculture, a magazine published at Harlingen in the heart of the Texas citrus belt, has the following to say of the recent visit of a party of Texas citrus men to their fellow growers in Florida, and pays a well-deserved tribute to J. L. Heid, well known citrus research chemist, now of Lake Wales:

A fruitful trip to the citrus area of Florida was made in January by W. Clifford Scott, chief chemist of the U. S. Fruit and Vegetable Products Laboratory in Weslaco; L. S. Hamme, assistant manager of the Rio Grande Valley Citrus Exchange; E. C. Christensen of Weslaco and Ray Losh of McAllen. They enjoyed a sort of reunion with J. L. Heid, who became well known as "Larry" Heid during his ten years of service in the Valley as chief chemist for the U. S. Products Station located during most of that period in a small building on the Experiment Station farm.

Chemical research to ascertain the special characteristics of Valley citrus was begun in this building in 1931 under the auspices of the U. S. Department of Agriculture, with a congressional appropriation of ten thousand dollars. Chemist Heid was transferred from the U. S. Laboratory of Fruit and Vegetable Chemistry in Los Angeles and W. C. Scott was appointed assistant chemist. Their work proved to be an important factor in bringing to the Valley a number of canning companies of national scope, and so gave a powerful impetus to the development of Valley canning from an infant industry in 1931 to one which now includes some fifty canning plants, with a 1944 production of nearly eleven and a half million cases of canned grapefruit juice and vegetables. This has been one of the most notable developments in the history of canning, and since it has added many millions of dollars to the revenues of Valley growers, they naturally think highly of "Larry" Heid, the young man who had so

much to do with starting our canning industry along progressive lines. Hence they are glad to learn that his success is no less outstanding in Florida, where he is research and chemical engineer for the Florida Fruit Canners' Coopera-

tive at Lake Wales, one of the largest canners' organizations of this kind.

For the purpose of giving co-operation a national scope in chemical research pertaining to citrus, (Continued on Page 11)

## NOW IS THE TIME ...TO ORDER YOUR SUMMER OILS



1) VOLCK Oils have a wide margin of safety . . . a highly necessary factor during the summer months.

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Year after year more citrus growers in Florida are turning to the use of VOLCK Oils for their summer spraying program because . . .

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## A STUDY OF STATE WATER RESOURCES

(Continued from page 5)

municipal or otherwise.

7. The actual intrusion of salt water in agricultural areas and in well fields.

8. The actual lowering of the level of organic soils as the result of oxidation, cultivation, burning, etc.

9. A large, but unknown amount of loss or damage due to old wells that are abandoned, or of unknown condition beneath the surface and of wells drilled for non-water purposes.

10. Failure on part of the State to collect data over a long period of years on many phases of water, as a basis for use by Federal Agencies in their surveys and actual construction of projects.

11. The annual rain-fall in various basins or sections of the State varies widely from year to year.

### Some of the Results, Both Actual And Economic

1. Damage to agriculture in all forms due to lack of sufficient water for plant growth; added costs of irrigation; and increased cold weather damage as the result of lowered surface water levels in some areas.

2. Damage to live-stock, pastures, crops and property from floods or excessive rains, as the result of inadequate water handling facilities or complete lack of same.

3. The actual abandonment of land due to over-drainage or to salt water intrusion, or a combination of these.

4. Actual damage and/or greatly increased expense to municipalities or private interests supplying water to municipalities, due to inadequate supply, undesirable quality of such water as is available to them, salt water intrusion in well fields and otherwise.

5. The cost of deepening existing wells and/or drilling new wells to supply sufficient water for many purposes in numerous sections of the State.

6. Actual instances where established properties, formerly getting sufficient water from their own wells or surface water supplies have been either cut completely off from water, or seriously endangered in their water supply, due to inadequate surface water

control facilities, or to new wells cutting off their underground supply, or to overuse or over-pumping of both surface and well supplies.

7. A water feast in one area or basin and a water famine in an adjoining area or basin.

8. Damaging effects or threats to wild life area and to fresh water fish.

9. Threat of damage or actual damage to public health.

10. Threat of damage or actual damage to various attractions and areas that are tourist centers and thereby of great economic importance to this State.

### What Can Be Done About It

The fundamental point seems to be for the State, its various subdivisions and the people to bear in mind that there are many angles making up the general subject of fresh water in this State. We must immediately take into consideration not only the primary angles of water supply and use, but also the conservation, storage, drainage, flood control and all other angles must be considered collectively for the future welfare of all concerned. Every agency or group, in planning or executing any of its direct functions or undertakings, should analyze them fully and carefully as to possible beneficial or detrimental effect on fresh water.

While the State certainly should render some assistance in this matter, to its sub-divisions and to its people, there are also some legal angles, financial angles and the extremely important angle of cooperating with pertinent Federal Agencies in which the State should take active leadership and discharge its sovereign responsibilities.

In some other matters of great importance, in past years, the State has taken these steps, on the wish of the people and for the good of the people. At the time these steps were taken, all the people did not agree on the need for, propriety of, or good results that were claimed would result from such steps.

The Committee finds that many other States have found it desirable to take similar steps with reference to the conservation, development and utilization of their water resources. This Committee, and its attorney, have reviewed the laws and experience of many of these States in this connection and have attempted to learn the good points from their experience and avoid difficulties learned in

these other States "the hard way."

This Committee believes that the best and most effective way of doing something about the complex water supply and control problems as they exist in this State, is for the Legislature to create an adequate State Authority; give it reasonable funds and authority, and give it real responsibility for doing a job. The Committee feels that the State is fortunate in that there are existing statutes which will help out materially if properly used. The most important one probably in this class is the State Improvement Commission Act of 1941, which we believe can be used by the State for actual construction, finance, property acquisition and other related angles. The Committee feels that it is necessary for the Legislature to create only one State Agency dealing with fresh water at this time.

(Continued on page 22)

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Orlando, Florida**



# FLORIDA-TEXAS CO-OPERATION IN CITRUS RESEARCH (Continued from Page 9)

Chemist Heid has been a prime mover in preparations to organize the Citrus Products Research Council, the members of which are agricultural scientists and processors in the several citrus areas in the United States. Those from the Lower Valley were invited to go to Florida to attend preliminary meetings. Lorne S. Hamme was elected first vice-president of the Council and E. C. Christensen and Ray Losh were given committee appointments. The general chairman is "Larry" Heid.

The purpose is to co-ordinate citrus research carried on in the different areas and to give the citrus industry in each the benefit of the findings. Wide variations in soil constituents and other factors affecting citrus trees and their fruit will be listed, assembled and studied for valuable or useful deductions as to fertilization and like matters affecting fresh fruit and juice. "Citrus analysis has been confined mainly to sugar, acids and oils," commented Chemist Scott. "Now we propose to dig more deeply into nature's secrets relating to citrus. We may find out, for instance, why the canning of orange juice in accordance with the most approved practices is not uniformly successful."

Discussions of citrus and its chemical mysteries were leavened for the visitors from the Valley by rides in the Heid speed boat on Lake Wales, and Clifford Scott rang the chimes in a high tower built on the highest elevation in Florida, 300 ft., by Edward Bok, who is said to have arrived in this country as a penniless Dutch boy. He achieved the editorship of the Ladies' Home Journal and finally the presidency of the great publishing company which publishes that magazine and several others of importance. He built the tower, with its joyous chimes, as an expression of his gratitude for the opportunities offered him in the United States.

**Buy 'em and  
Keep 'em** **WAR  
BONDS**



## JOHN DRYDEN said it....

*"Much labor is required in trees:  
Well must the ground be digg'd,  
and better dress'd,  
New soil to make, and meliorate the rest."*

THE ENGLISH POET John Dryden made this statement, but any Florida citrus grower might have said it.

FLORIDA'S CITRUS growers know how much labor is required to keep citrus trees in top productive-ness—the cultivating, irrigating, pruning, fertilizing, and pest control. Furthermore, they agree with Dryden that the most important grove tasks are "digging" the ground well and frequently, and "dressing" the ground with fertilizers three or four times a year to meliorate or improve the soil—to keep it fertile.

THAT'S WHY SO MANY successful Florida growers insist on Gulf Fertilizers. They know they get the maximum results for their labor.

GULF FERTILIZERS, you see, are keyed to Florida soils — they supply deficient elements and replace the plant foods used by growing crops. Gulf Brands are the result of more than 40 years of experimenting and actual field testing.

FOR MORE FRUIT of better quality, rely on Gulf Fertilizers and Gulf Field Service.

For Everything that  
Grows in Florida... use  
**GULF** Brands of

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Tampa and Port Everglades, Florida



# Eddie Finds Himself On the

Trying To Tell About Irrigation . . . Forecast Season  
. . . And Describing The Antics Of A Bulldozer

When the boss came to me one day a couple of weeks ago and asked, "have you got your work in pretty good shape?" I, like the sucker I am, said, "sure Boss, it's been a tough job with all I have to do, but I've got everything right up to the minute."

Then the Boss said, "Okey, that's fine. Come with me and we'll spend the day looking over some groves."

So that's how I found myself on the spot. As a matter of fact I was way behind with my work at the office and had sat up practically all night with a sick friend the night before, helping him take his medicine every now and then, so I had a peach of a hang-over—I mean headache. But like a lot of other guys I know I'd talked too fast and too much, so I was in for it.

"Well, Eddie," says the Boss, "the drouth we have been having for the past several months has just about wrecked a lot of groves so we're going to go over a lot of groves that have been irrigated as well as a lot that have not and I want you to write down your reactions."

Well, the way I felt I figured that water was just about the most important thing in the world—and I didn't see anything on the trip to change my mind. So just to get it down right fast I'll tell you right now what my reactions were.

As I have said even before seeing a single grove I figured that water was a pretty swell fluid and after seeing the sick looking groves which were parched and dry and thirsty for lack of water and the green, healthy, sturdy groves which had been adequately supplied with water through irrigation, it's just my bet that every grower who can possibly do so is going to arrange to irrigate his groves from now on out.

Groves can't take the pledge not to sit up with more sick friends, like I have done. If their throats come dry and full of cotton they can't do any about it without some help, where for me I can lie in a tub put my mouth under the faucet and even get well without any outside help.

Anyhow, I reckon if I want to hang on to this I'll have to write some of the things I saw even if glimmers were a little foggy.

We drove over into Polk county and picked up Shock at Winter Haven and the three of us drove over that county—if we missed looking at a single one of the thousands of groves in that county I don't know whose it was.

But everywhere we went the story was the same. Groves which had waited for months for the rain to come to them a drink had their leaves all curled up, practically all of the fruit which had set earlier in the season was on the ground and generally were a sad looking grove.

The groves which were irrigated were green and their fruit was looking good, but even these groves had had anything like the crop of fruit on them that had a year ago when the Boss took me over this territory.

And right here is where I make a forecast for myself. The Boss said that it looked to him like this season's crop wouldn't be much more than 50 percent of the crop for the season just closed. Personally, I can't tell when a tree has one box or forty on it, but I bet him a new necktie—my old one's about worn out—that Florida wouldn't have more than 40 percent as much fruit this year as last, counting storm losses and everything. Maybe that's a sure nuf sucker, and if the Boss sees this before it is printed he may cut out my crop forecast, but that's how it looks to me.

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# the Spot...

## Season's Crop

The Boss and Bill jumped out of the car every few feet to look through their magnifying glasses at red spiders and 6-spotted mites, but, me, I didn't move around any more than I had to.

I don't know anything about these bugs and I didn't have a microscope with me, but I still claim that it won't be long until every citrus grower in Florida will have some arrangements made for watering his groves during the dry season—that is if he wants to make a good crop every year.

Saw Tom Swann again on this trip and he says that I'm plumb right about it—said, as a matter of fact that from 60 to 75 percent of the growers on the Ridge already were equipped to irrigate. And speaking of Swann we went down to one of his places on Lake Eloise and learned if he hasn't got him a private Cypress Garden down there on the shores of the lake. Hardly ever saw so many azaleas, gardenias and japonicas in my life and if he ever builds a home down there as I have a suspicion he's figuring on he'll have one of the finest beauty spots in the state.

Well I've given you my "expert opinion" about irrigating and about the size of this season's crop so now I'm going to tell you something we saw that I wouldn't have believed if I hadn't seen it with my own eyes.

One grower who has decided to specialize on a certain variety of fruit was having 17 acres of old citrus trees taken up. When the Boss said we were going to see that operation I figured on seeing several hundred men sweating and digging and hauling and pulling. But when we got to the grove there was one man riding a bulldozer doing the darnest things I most ever saw.



He would move a gadget that lifted the fork at the front of the machine a couple of feet off the ground, back up maybe three feet then bat right into those big trees and knock 'em for a loop. Then he would let the fork down and back up again and in less time than it takes to tell it would shove the tree, roots and all right into a big pile where they would be burned later on.

Well, sir, when I saw him do it the first time I just didn't believe it, but when on the next trip he pulled two trees at a time I knew it wasn't so. Then when he backed off and took three at a clatter I gave up. Anyway we timed him for a while and he was digging up those big old trees at the rate of better than two every minute.

He did things with that machine that just couldn't be done and he had the darnest mess of gadgets to fool with, which made the old steel baby do everything but lay down and roll over. I could have sat there and watched him all day, and would have too, except that the Boss after suggesting that we move on finally cracked, "what you reckon I'm paying you for, anyway?"

I didn't answer that one, because sometimes I wonder myself.

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# RELATIONSHIP OF SOLIDS AND RATIO TO THE TIMING OF OIL SPRAYS ON CITRUS

(Continued from Page 8)

tion was made at the latter date. See Figure 6. It is interesting to note that the solids were higher in plots that received the second spray on September 16 or November 14 than in plots receiving an initial spray on those respective dates but it may be a result of the June spray reducing the scale population to such a low level that the

spray in November had become quite heavily infested with purple scale before they were sprayed and the solids were lower in those plots than usual. It was also evident that the solids were higher in plots sprayed on June 1 and June 15 respectively and again on November 14 than in plots receiving the initial spray on November 14. The plot receiving the initial spray in June were more or less free of scale during the summer months whereas the scale became noticeable by August in the Novem-

ber in June and July than in plots sprayed in August, September and October. In 1943 there was little or no difference in ratio in the early and late sprayed plots. Figure 2, Figure 3 and Figure 4. However, since the ratio was low in 1941 and 1944 it would seem advisable to apply the oil spray as early in the summer as practical. The ratio of Excelsior grapefruit did not appear to be affected as much as oranges by the late summer oil sprays. In 1943 and 1944 the ratio was not any lower in plots sprayed after August 1 than those sprayed earlier in the summer.

**Conclusions.** Oil sprays applied after August 1 either delayed or prevented the formation of maximum solids, especially during the early part of the picking season. During some years the ratio in Pineapple oranges picked from trees sprayed after August 1 was lower than those sprayed in June or July.

When practical oil sprays should be applied in June or July to minimize any effect the spray might have on delaying the formation of maximum solids or in delaying maturity in general. The early oil sprays are especially important on varieties that normally have low solids and varieties that are to be moved early in the season.

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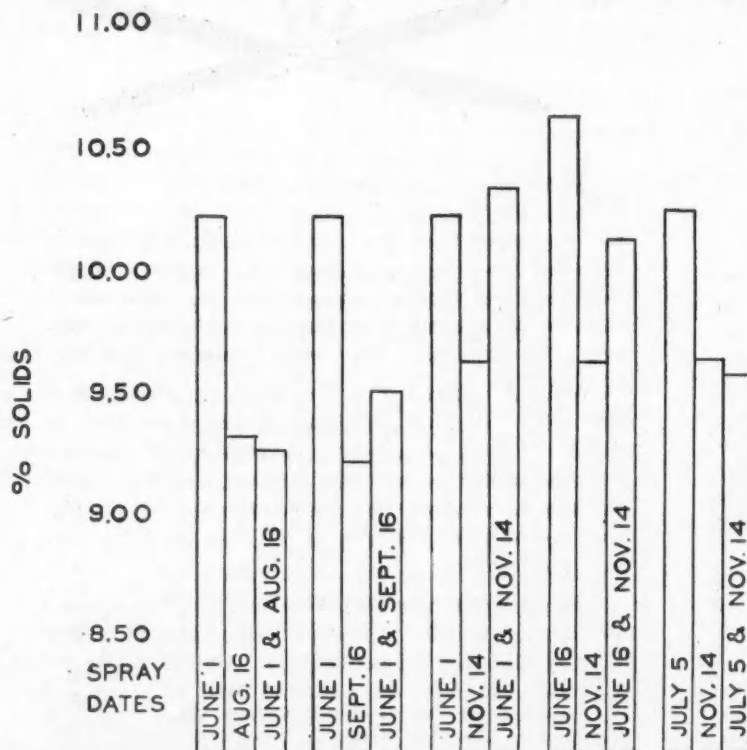


Fig. 6 — Comparison of solids in relation to timing of two oil sprays on Pineapple oranges in 1944. Analyses made Dec. 12, 1944

scale was not a factor in preventing the formation of solids as they may have been where no spray was applied until September or later.

In regard to scale being a factor in preventing maximum solids there is some indication that such is the case. In 1941 and 1944 the check plots were rather heavily infested with purple scale during the early and late summer months and in those two years the solids were lower in the check plots than in plots sprayed in June or July. In 1942 and 1943 the check plots had very light infestations of scale and during those two years the solids were as high or higher in the check plots than in the treated ones. In 1944 the plots receiving the initial

ber treated plots.

Grapefruit was affected more or less in the same way as oranges in regard to the timing of oil sprays. Excelsior grapefruit trees were used for the oil timing experiment in 1943 and 1944. Although data for only two years are available, there was a trend of lower solids in plots sprayed in August and September than in plots sprayed during June or July.

**Ratio.** The difference in ratio of solids to acids between early sprayed fruit and later seasonal applications was not so marked as the solids. Nevertheless in 1941 and 1944 in early November the ratio of Pineapple oranges was higher on an average in the plots sprayed

## HOTEL PUTNAM Fireproof DeLAND'S FINEST HOTEL

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## Is The Government Going Into Business?

Ralph T. Jones, In Atlanta  
Constitution

Some who read the heading of the column will snap right back, "Gosh, the government's been in business for a long time." Maybe they are right. It is a question which can, at least, become the springboard for a lot of argument and discussion.

However, the inspiration for the thought, this morning, comes from some friends either directly or indirectly interested in the fertilizer business. According to their information as given to me, the government is threatening to enter this business. Whether that would be good or not good for the farmers who use fertilizer is a point too involved for me to intelligently discuss.

Here is the form of the threat, as explained by these friends of mine:

They say there is a bill, now in the senate hopper, introduced by Sen. Lister Hill, of Alabama, which provides for the establishment of government-owned and government-operated fertilizer plants, for the manufacture and distribution of their products through government controlled agencies. Furthermore, they say, even before the introduction of Sen. Hill's bill, there was an amendment in the senate appropriation bill to provide \$3,000,000 for the construction of a fertilizer plant at Mobile.

This looks, as they say, very much like putting government into competition with private business. Therefore, it is a rather obvious straw in the wind and a matter of supreme importance to all private industry in this country.

### Food Production

The productivity of our farms is the most conclusive indication of the efficiency of fertilizer manufacturing as a private industry.

It should be noted, then, that the wartime record of the nation's farmers is fully worthy of honors as high as any, according to the manufacturers of any of the implements of war. While our heavy industry has, deservedly, been acclaimed as achieving a production miracle in the number of ships,

planes, tanks, guns, and all the other things of war they have turned out, we are, perhaps, apt to overlook the parallel miracle of

food production achieved by our farmers.

Food production, in required quantity, was considered a major problem at the start of the war. Some "experts" simply threw up their hands, back in 1942, and said America could not possibly keep up with the increasing world and national demands for food.

(Continued on page 22)

## It Has Been A Long Time....

### But finally the rain came

And the thirsty groves have already reacted to the friendly influence of the badly needed water.

We are not forecasting the weather, but we do suggest that the very minute there is sufficient moisture in your grove to insure proper assimilation, that you make your summer FFFertilizer application.

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## Reports Of Our Field Men . . .

### WEST CENTRAL FLORIDA

**E. A. (Mac) McCartney**

The severe drought has caused a heavy droppage of the new crop of fruit and the size of the crop that we will have for next season will depend on just what late bloom we have during May. It is probable that we will get some bloom and this should make good quality. The value of constant cultivation during dry weather was definitely proven during recent weeks, and those growers that harrowed often stood the drought much better than those non-cultivated groves. The Valencia deal is just about over in this section with only a few insolated crops remaining to be moved to market. Vegetable crops that have not had the advantage of irrigation have been very poor while those growers that were equipped with irrigation brought their crops through in fine shape. We are getting our summer application of fertilizer under way and hope to be through by the middle of June.

### POLK COUNTY

**J. M. (Jim) Sample**

This is April 21st and the dry weather continues to be of prime importance in this section. We have not had any rain of consequence since January 11, and non-irrigated groves are in a serious predicament and next year's crop is disappearing fast. To begin with our seeded grapefruit, tangerines and many early oranges did not bloom satisfactorily, but with this dry weather a great deal of what was on the tree has fallen off. We have had lots of trouble throughout this territory with six-spotted and purple mites and due to the extreme drought it has been dangerous to spray. In some cases we have suggested that groves be sprayed with 2/3 pound of DN plus 10 pounds of wettable sulphur to 100 gallons of water if the leaves were merely dropping instead of in a dead wilt. There are some Valencias in the section but most of this fruit is being moved to the canners. In

many instances the packing houses are closing down and selling their remaining Valencias to the canners because of the price deal.

### NORTH CENTRAL FLORIDA

**V. E. (Val) Bourland**

From information that I have regarding conditions in other parts of the state I am sure that this report will be a repetition of that made by the other men, but with sufficient rain at an early date it is the general belief of growers throughout this section that we will have a heavy May bloom. In the case of late varieties of fruit it has been our experience that we can make good quality from a bloom in May. Regardless of the dry weather a number of growers have gone forward with their summer application of fertilizer and are using a well balanced mixture containing all of the secondary plant foods. We still have a few crops of Valencia oranges and also a very few crops of Marsh seedless grapefruit. However, this is rapidly being moved to market at very good prices. The vegetable crops, mostly on irrigated land, have held up very well and most growers will call the season successful. The watermelon crop in Lake County looks fairly good.

### SOUTHWEST FLORIDA

**F. W. (Felton) Scott**

This is the second successive spring that we have had severe dry weather and I can tell you now that unless we have a late bloom there will be very little fruit in this territory during the coming season. Even on the groves that have been irrigated we have had a heavy droppage of young fruit. In some cases we are having trouble with irrigation wells. Due to the dry weather we are way behind with all grove work, especially with the spray program. The spring tomato crop is being moved to market and the one bright spot this spring is the unexpected yield of tomatoes that we are getting. At first it appeared that

the crop would be extremely light but to the surprise of most everyone we are getting fairly good yields of quality produce. Even some of the fields that fired earlier in the season have come out and we are getting some tomatoes. Other vegetable crops have been doing fairly well. The celery growers of the section have had a very successful season.

### HILLSBOROUGH & PINELLAS COUNTIES

**C. S. (Charlie) Little**

By the time that this is published I am hopeful that we will have had plenty of rain, but at this writing the only way I can express just how conditions really are is to say that groves in general are in "pretty foul shape". We have a considerable acreage of property in this territory equipped with irrigation, and these groves are fairly well maintaining themselves, but those that have no irrigation are awful with a large percentage of the new crop already on the ground. Valencias are rapidly being moved and the canners are beating the bushes to find the few remaining crops. Most growers in this territory have had a most successful season, having received very good prices for all varieties of fruit and these men are looking with optimism to the coming season.

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Shore beats all how much fruit these here Florida citrus trees can grow. Fellar who keeps a check on the fruit that is picked off Florida's citrus groves says that at the middle of April 35,500,000 boxes of oranges had been picked 'n shipped to the market or sold to the canners. This same fellar says the whole orange crop is goin' to run up to 43,500,000 boxes of oranges. This is nearly five millions more boxes than was picked last year — makes a guy wonder what we'd a done if the storm hadn't knocked a lot o' fruit on the ground. Seems like they's still two million boxes o' grapefruit to move out of a total crop of 23,100,000. The folks who can grapefruit and juice 'em has taken the big end of this crop.

As we git older we find they's scarcely anything that supprises us any more, but we durn sure are havin' a time figurin' out how the agricultural business, short of help like it is, and without much of the farmin' equipment it needs and with transportation sort of messed up has done the job its done. Last year the farmers of the United States ridin' all these handicaps raised more food, per man, woman and child in these here United States than has ever been raised before.

Them as knows says they don't think it can be done again this year. Last year this country raised 147 pounds of meat for every person on the census rolls of this nation. Leastwise that much meat was eaten. These guys that figger out such things says that they'll only by 128 to 133 pounds butchered and et this year, but they call attention to the fact that in 1935 and all through 1939, which was looked on as pretty good years, that folks got only 126 pounds of meat apiece to eat. And that's only one of the items that farmers did a swell job of producin' on.

You talk about a long, dry spell. Well, brother, jist in case you didn't know it, we done had one. While they's been some rains the last week or two that's helped out a heap they's still lots of spots where it's still bone dry. Naturally the citrus growers, the vegetable growers and the cattle raisers has all suffered.

The citrus grower has just about reached the conclusion that he's got to irrigate, jist the same as he's got to fertilize and spray. Even them as had irrigation had a lot of fruit drop on the ground, but he didn't lose near as much as the fellar who didn't irrigate. The groves that was cultivated good and fertilized right came out a heap better'n those that wasn't, but it shore looks like most every citrus grower has got to be ready to irrigate from now on out. The vegetable grower who wasn't fixed to water his crops jist about lost his shirt, but the fellar who could irrigate and who fertilized his crops right is goin' to come out okey.

The cowman that didn't have some low land where the grass got enough water to grow wasn't so hard hit, but they's a lot of 'em who wasn't fixed like that and the cattle shows it. 'Course there's a lot of cattle raisers who've fertilized their pastures with lime, copper and phosphate and other elements and who've cultivated their pastures that's doin' all right.

Looks like everyone who grows anything to eat in Florida has got to make up their minds to help Old Mother Nature out from now on if they want to prosper.

**Uncle Bill**



# The "Tristeza" Disease Of Sour Orange Rootstock<sup>1</sup>

While studying the citrus industry in South Africa in 1924-25 (10), the writer made rather extended notes on the failure of the sour orange as a rootstock for the orange in all parts of that country as far north as southern Rhodesia. The trouble or malady had been given no distinctive name, and at that time was unknown elsewhere. It has since appeared in Java, Argentina, and Brazil where it is reported to be causing severe damage. Moreira (7), who has studied the disease in Brazil, referred to it as the "tristeza" of citrus. This is a short word (Portuguese for melancholy or sadness, and the same in Spanish) characterizing the trouble and may well be used in all languages as the standard name for the disease.

It may be stated further that regardless of the cause of the trouble, whether it is due to a parasitic fungus, bacterium, a virus, a toxic substance, malnutrition, or climatic influence, it is entirely proper to call it a disease. Any adverse condition is a disease in its effect on the plant, if it produces a deranged or morbid condition.

The tristeza disease, is so far as known to the writer, was first noted in South Africa, and the following is an outline of the early historic data.

Up to near the end of the 19th century, citrus-growing in South Africa employed mainly seedling sweet oranges and tangerines or trees propagated from good seedlings by layering; and a scattering of trees of various sorts grafted principally on Rough-lemon stocks. Grafted or budded trees at that time had been very little used in South Africa and the industry was small. In the last decade of the century the loss from foot rot, or collar rot as it is there called,

1/ Paper No. 495, University of California Citrus Experiment Station, Riverside, California.

2/ The writer is indebted for many suggestions to Dr. W. T. Swingle, of the U. S. Department of Agriculture, and to Dr. H. S. Fawcett, of the University of California Citrus Experiment Station.

By H. J. Webber, 2/ University of California, Citrus Experiment Station, Riverside, Calif.

became so serious that a government commission appointed to study the situation urged that growers use only trees worked on sour- or Seville-orange stocks. In 1896 the Cape Agricultural Department issued a circular urging the use of the sour orange and stating that "so much has been written on this subject, and the universal practice of European countries has so emphatically endorsed the wisdom of using the Bigarade or Bitter Seville orange as the healthiest and strongest citrus stock, that little additional remark need be made here" (4). As a result of this consistent recommendation of the sour-orange stock by government agencies, nurserymen found it necessary to use only sour-orange stock, as otherwise they could not sell their trees. Many thousands of trees were worked on sour stocks, sold, and planted. In a few years all of these had died, but it was long before the cause of their failure was definitely attributed to the use of sour stock. Another commission inquiring into the failure of citrus trees 10 years later found that there were healthy 50-year-old orchards on Rough lemon, and that stock soon came to be used almost exclusively (6).

In 1924, Davis wrote (4), of South Africa: "The 'Bitter Seville,' and 'Florida Sour' make, as seedlings, exceptionally fine trees. About 12 kinds of Oranges, Naartjes (mandarins), and some Lemons were budded on these stocks, and at the end of 3 years, there was not one of them alive. The soil was a somewhat sandy medium red loam, 20 feet deep. In one instance where the bud had died, the stock remained alone and grew into a remarkably fine tree." Davis also described an earlier experience (about 1899) in which three varieties of lemons and some Washington Navel orange trees, all budded on sour-orange stocks, were planted in Cape Colony. The or-

anges grew well the first year, but growth ceased the second year and in the third year all died. The lemons, however, grew well and were reported as still living and profitable in 1924.

Davis thus indicated that oranges and mandarins or sour stocks failed in a few years, but that in one case lemons on sour stock were entirely successful.

The results of the writer's study of this subject in South Africa (10), written before Davis's publication was available, brought out the following points:

1. The writer stated: "All of these groves of oranges on Seville stocks proved failures and have gradually disappeared, so that the writer has found difficulty in finding even a few trees here and there of moderate age, none over about 20 years, which are still living, and these are much dwarfed and worthless as producing trees."

2. The writer called attention to the wide range of soils on which the disease was fatal, and to the fact that on similar soils in other countries trees of the same combination were successful.

3. The use in Africa of uncongenial strains of the sour orange was excluded by the writer as a possible cause of the disease because he had examined several 2- to 10-acre plantings of imported trees in several localities of Valencias and Washington Navels, budded on sour stocks in California and Florida, in which all of the trees, 2 to 5 years after plant-

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ing, were dead or in various stages of collapse. Many such trees were dug and carefully examined, but no evidence of any causal agent could be observed. Again considering the number of sources from which the sour-orange seeds came, that were used to grow stocks in South Africa, it is inconceivable that all would be incompatible or uncongenial.

4. The writer pointed out that trees of the sour or Seville orange, grown as seedlings or budded on Rough lemon, appeared to be vigorous, healthy, and of normal size and productiveness. This was observed in a number of localities. The same was found also to be equally the case with the sweet orange and the mandarin.

5. No cases of grape fruit and mandarin varieties propagated on sour orange, were found by the writer. The common testimony of growers was that these combinations were entirely unsatisfactory, but whether or not in equal degree could not be determined with certainty, as the cases of actual experience were few.

6. The testimony of growers, and the observations of the writer indicated that lemon varieties worked on sour-orange stocks were not subject to this disease. Several small lemon groves, 20 or more years old, were studied in Cape Colony, and yard trees in many other places, and none of them exhibited any signs of collapse, though not all of them were in good condition. It would appear that lemon or sour is not subject to the disease.

7. The writer's observations also indicated that the Rough lemon and the sweet orange used as stocks for varieties of the sweet orange and the mandarin were not noticeably affected by the disease. It was thus indicated that these stocks are immune or in some degree resistant to the disease.

Powell (12) discussed the failure of sour-orange stocks in South Africa, but cited no additional observations other than the following: "When imported trees that are budded on sour stock are inarched with small Rough lemons they develop normally."

The next study, of what appears to be the same disease, was made by Toxopeus (8, 9) in Java. In his investigation he demonstrated that the bulk of the sweet orange united normally with the sour stocks and that the sprouts developed and grew well at first,

but soon showed symptoms of decline and usually died within 8 to 12 months. The sweet orange varieties used in his experiments included Valencia, Washington Navel, and Hamlin, sorts that succeed well on sour orange in most countries. The "Japanese citron" (*C. nobilis* x *C. medica* ?), which grows fairly well on sour stocks in Java, was used as an interstock between the sour stock and the sweet-scion variety, but it had no effect in prolonging longevity. By using all possible combinations of the sweet, sour, and "Japanese citron" either

as stock, interstock, or scion, it was found that the failure of the combination occurred only when the scion or top was sweet orange and the stock or interstock was sour orange. The budding of both sweet orange and "Japanese citron" into the same sour-orange stock resulted in the death of the plant, but the inarching of sweet orange with both sour orange and "Japanese citron" resulted in the death of the sour orange only. Toxopeus thus concluded that the sour-orange stock does not injure the sweet orange, but that the sweet-



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orange scion produces some substance injurious to the sour stock. This apparently indicates the source of the injury, but as yet no explanation has been found as to why such contrary results are produced in different locations.

Toxopeus (9) eliminated soil differences as a factor in the cause of the disease because in "Java with its numerous soil types, the combination would be expected to succeed at least in some places, and some success should be gained by manurial treatments." Also because of the known distribution of the disease, he eliminated the lack of a rest period, or the length of day as causal factors.

Marloth (6), in studies at Nelspruit, Transvaal, made tests with eight different varieties of sour orange used as rootstock and reported that after 7 years of experimentation he had been unable to produce good trees of any "sweet orange or tangerine variety on sour stocks. Some degree of success was obtained with grapefruit and tangelo varieties, and no difficulty was experienced when lemon varieties were used."

(Concluded next issue)

## Citrus Laws Enacted By State Legislature

Florida citrus growers are gratified by the action of the Florida legislature in acting favorably upon all legislation proposed by the industry, including the doubling of the advertising tax on oranges. Favorable action on this latter item is expected to provide the Florida Citrus Commission with an advertising fund of approximately one million dollars annually in the promotion of sales in Northern territory.

Other bills enacted were largely in the nature of renewal of laws expiring or about to expire and all had the approval of the great majority of men in the industry, including growers, shippers and canner. Insofar as this feature of the present legislative session is concerned, citrus growers have no complaint to register.

### CHARLES J. BRAND RETIRES

The many friends of Charles J. Brand among Florida citrus growers and shippers will be interested to know that on April 1 he retired as executive secretary-treasurer of the National Fertilizer Association, a position which he had held for the past 20 years. It is announced that Mr. Brand will devote himself to literary work along horticultural and agricultural lines, subjects with which he is familiar from long association with those industries.

## Retain State Plant Board

Writing to the editor of The Citrus Industry concerning a proposal to abolish the State Plant Board and to transfer its duties to a new department to be known as the Conservation Department, one of the leading horticulturists of the state voices his disapproval of the suggestion in no uncertain terms. He says:

"For thirty years the State Plant Board has administered nursery inspection, port inspection and general quarantines for the safeguarding of Florida's agriculture and horticulture. The work under the guidance of the State Plant Board has been carried out successfully and efficiently with a minimum of expense for administration. The State Plant Board of Florida is second to none in the United States and this has been due to its efficient administration, the ability and integrity of its officers and last but not least to freedom of its work from political interference. It is my belief that transferring its work to a new organization or department will seriously impair the value of the Board's work to the State of Florida and will make neither for efficiency nor economy.

"At this time and through the years past, the State Plant Board has been assisted greatly through connections with the Agricultural Experiment Stations and the Agricultural Extension Service. The State Plant Board is composed of the same members as the State Board of Control and as a result, all agricultural activities relating to research, teaching, extension and protection against inroads of insect pests and diseases are unified and coordinated. The proposed reorganization would definitely break these mutually helpful relations."

To every word of which this publication heartily agrees. Citrus growers would do well to voice their opposition to the suggestion by writing their senators and representatives in the Florida legislature.

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## Florida's Citrus Program Meets All Present Needs

J. FRANCIS COOPER

Editor Florida Experiment Station,  
in February issue "Farm For  
Victory," published by  
Chilean Nitrate Educational Bureau

Florida citrus growers may have plenty of headaches in the future, but worry about proper fertilization should not be one of them. A coordinated nutrition program, including both fertilizers and sprays, has been evolved by the Citrus Experiment Station at Lake Alfred which seems to answer the needs of today and can be varied to fit any new demands which may develop. It enables growers to keep their trees in good condition by stopping nutritional deficiencies before they develop. By its use growers can produce one good crop of fruit right after another. Before the October hurricane blew down an estimated 20 million boxes of the 1944-45 crop, it was estimated that the state's yield would approximate 100 million boxes — more citrus fruit than the entire United States produced less than a score of years ago.

Nutritional deficiencies, mostly involving minor elements — since Florida citrus growers have been heavy users of regular fertilizers for years—have developed one after another during the past two decades. Investigators attacked first one deficiency and then the other. Finally, in recent years, Dr. A. F. Camp, vice-director in charge of the Citrus Experiment Station, and his staff correlated the work on the various deficiencies and evolved a fertilizer program which keeps the trees healthy, avoids the loss in condition and production which has already occurred by the time a deficiency becomes evident, and enables trees and fruit to withstand cold with less damage.

Nitrogen, phosphorus and potash, of course, form the basis of the fertilizer recommended. For sandy soils, which constitute the bulk of Florida's citrus acreage, the complete formula is 4-6-8-2 or 3-1-½, nitrogen, phosphorus, potash, magnesium, manganese and copper, in that order, plus sprays containing zinc sulphate. It is not absolutely necessary, says Dr. Camp, to follow the exact percentages listed in the master formula, but if varia-

tions are employed all elements should be varied in approximately the same proportion. If a grower wishes to use a 6-9-12 mixture, he should be sure that his magnesium oxide content is increased to from 3 to 4½ percent, his manganese 1½ and his copper to ¾ percent. This gives a 50 percent stronger

mixture of all elements.

Growers generally fertilize three times a year; February, June and September. The formula for any one of the applications can be varied to suit the individual grower, so long as the year's applications total up the approximate percentages of the master formula. However, the master formula is satisfactory for each of the three applications.

The application of zinc in fertilizers is not recommended on Nor-

(Continued on next page)

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A fertilizer material rich in Magnesium for grove, nursery and farm requirements. Contains an average of 80% Magnesium as Magnesium Oxide — immediately active and available for improving soil pH Value, correcting Magnesium Deficiency, and building up a Magnesium reserve in the soil.

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in your favorite fertilizer brands at from 2 to 4 units for maintenance depending upon conditions, or will recommend direct application for correction of severe Magnesium Deficiency at a rate per acre to suit your particular condition.

#### "BRONZING" (Magnesium Deficiency)

of citrus trees and the various symptoms of Magnesium Deficiency in vegetables indicate serious losses in production which you cannot afford to take. The use of Texas Calcined Magnesite will pay big dividends in healthy trees and plant condition, increased volume of production, and improved quality of fruits and vegetables.

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Parrish Fertilizer & Manufacturing Co., Deland, Fla.  
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# FLORIDA'S CITRUS PROGRAM MEETS ALL PRESENT NEEDS (Continued from preceding page)

folk, Blanton and Eustis sands, since it appears to combine with organic compounds in the soils and become unavailable. Foliage sprays of zinc sulphate are efficacious in correcting frencing, the term applied to the malnutrition symptom induced by zinc deficiency.

Control of pH, or soil reaction, is an essential part of the program, since a pH reading above 6.0 induces frencing, as well as manganese deficiency, and a pH reading below 5.5 is apt to induce bronzing, or magnesium deficiency. Since it is impossible to maintain a constant pH, Dr. Camp recommends the application once a year of sufficient dolomitic or calcic limestone to raise the pH to 5.5 or 6.0, so that it will hardly drop below 5.3 by the end of the year.

The spray schedule also is an integral part of the production program, many of the sprays supplying nutrients as well as controlling citrus pests. A dense foliage, such as is apt to be found on healthy trees fertilized by the master formula, is essential to high fruit production but it also offers an excellent opportunity for destructive insects to develop.

The Citrus Station staff recommends: (1) a dormant spray applied in January or February to all trees (even those with fruit still on them) and containing 3 pounds zinc sulphate, 2 gallons, liquid lime-sulphur (or its equivalent in dry lime-sulphur), and 8 pounds of wettable sulphur to 100 gallons; (2) a post-bloom melanose spray applied about two weeks after the blossom petals have fallen, composed of either 3-3-100 bordeaux mixture plus 10 pounds of wettable sulphur, or proprietary copper plus wettable sulphur; (3) an oil spray between May 15 and August 1 for grapefruit and June 1 and July 15 for oranges; (4) one additional sulphur spray (two if needed) applied in late summer, usually late August or September. Examinations for rust mites should form the basis for timing this last sulphur spray or two, since the spray is not necessary unless rust mites are present.

Farmers of the program make no recommendations as to the amount of fertilizer to be applied, since most growers are following a program in which sufficient fertilizer is applied. However, if the formula

# Fellowships Awarded To Five Workers In Experiment Station

Five staff members of the University of Florida Agricultural Experiment Station have been awarded General Education Board Fellowships for advanced study and research, Dr. H. Harold Hume, provost for agriculture at the University, announced recently.

The five are Max Brunk, economist; Roy E. Blaser, agronomist; George D. Thornton, assistant soils microbiologist; Gaylord M. Volk, chemist; and John W. Sites, horticulturist.

Mr. Vold will do research in soil chemistry and plant nutrition at the University of Wisconsin; Mr. Brunk will work in the field of agricultural economics at Cornell University; Mr. Blaser will do advanced study in agronomy at North Carolina State College; Mr. Thornton will do research on soil fertility at Iowa State College; and Mr. Sites will work in the field of horticulture at Ohio State University.

# A STUDY OF FLORIDA'S WATER RESOURCES (Continued from page 10)

Most citrus growers, we believe, are in hearty accord with the findings and recommendations of the committee and are hopeful that the legislature may act in accordance with those recommendations.

# IS THE GOVERNMENT GO- ING INTO BUSINESS? (Continued from page 15)

Well, from 1942 through 1944, the farmers stumped the experts. Each of those years saw greater food production than ever before. Farmers got larger yields from the same land, they broke their own records—although farm equipment was often not procurable—by better management. And by the use of more fertilizer.

The fertilizer industry, next in line, had its own wartime problems to face. Freezing of materials and equipment hit the fertilizer manufacturers, just as it did everyone else. They had to meet the increased demands practically without expansion of their facilities.

Now, waiting like all of us for reconversion and the resumption of normal industrial conditions after the war is done, the fertilizer industry wants to expand its facilities. Doubled, the amount applied should be cut in half.

ities, replace outworn equipment and generally be ready for the demands of the coming years when a world at peace will strive again to accomplish the ideal of food enough to remove fear of hunger from everyone.

But, if the threat of government competition in their business is to hang over the heads of the industry, it is going to be difficult, at least risky, for the fertilizer manufacturers to thus improve and expand their plants.

# CLASSIFIED

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**PEACH TREES — IMPROVED JEWEL VARIETY.** Labor conditions will permit production of a limited number of these special Jewel peach trees sufficient for sale on reservation only. Reservations accepted in order received until June 1st for delivery January, 1946. Clay Hill Nurseries Co., P. O. Box 2880, Tampa, Florida.

**FOR SALE**—About 50 yards chicken fertilizer at \$4.50 per yard F. O. B. our farm. Snyder's Poultry Farm, Rte. 1, Summerfield, Fla. (Marion).

**FOR SALE** — 35,000 ft. 8-5/8" OD 21.31 L. W. Line Pipe in 40-ft. Lengths P. E. Beveled, used but in excellent condition.

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921 East Michigan Ave. Jackson, Mich.

Will pay \$5.00 for a used Citrus BUDDING KNIFE in fair condition. Can also use badly worn budding knives if still serviceable for \$2.50. Will buy a number of "Rogue" citrus seedlings from nurserymen, 10 cents per seedling. Must be vigorous variant plants. Donald J. Nicholson, 1224 Palmer St., Orlando, Fla.

**CITRUS TREES**—Best quality usual varieties on sour orange or rough lemon stock. Robt. P. Thornton, c/o Clay Hill Nurseries Co., Box 2880, Tampa, Florida.